# Attachment behaviour of pathogenic bacteria on food and food contact surfaces in container transport

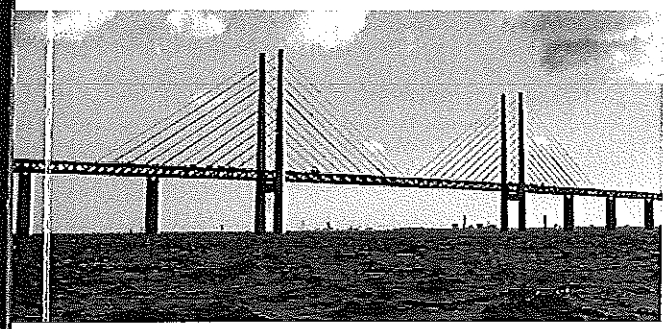
Abban, Stephen; Jespersen, Lene

*Published in:*
22nd International ICFMH Symposium Food Micro 2010

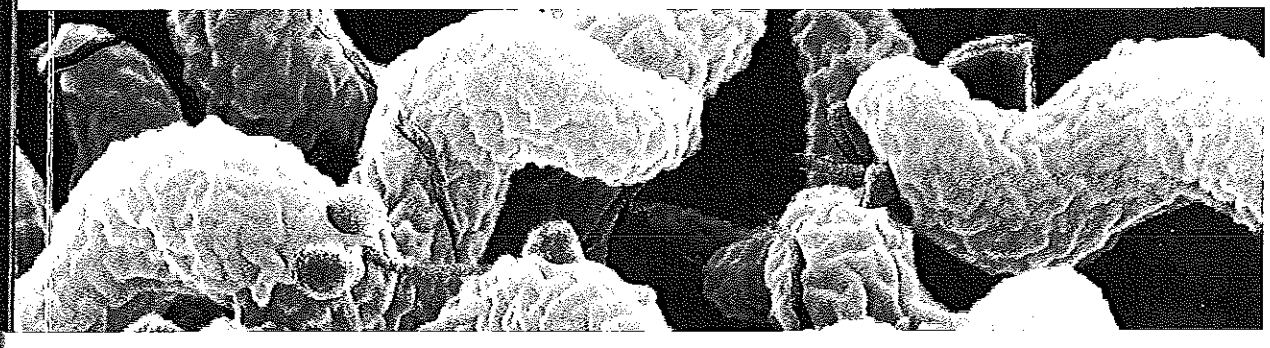
*Publication date:*
2010

*Document version*
Early version, also known as pre-print

# 22nd International ICFMH Symposium Food Micro 2010



Copenhagen 30th August – 3rd September



Final Programme & Abstract Book

FOOD MICRO 2010
Microbial Behaviour in the Food Chain

www.foodmicro.dk

# Author index


Abay S PED2.60
Abban S PEA1.70
Abban, Stephen PSD1.03
Abbasadegan M PEC2.45
Abdelgadir WS PEA1.70
Abee T PEC1.29, PEB2.29, PSD2.02, PSB2.03
Abee Tjakko PEB2.09
Abildgaard L PEB1.30
Adam Katharine PEB2.02
Adebayo CO PED2.26, PED2.27
Adelantado C PEB1.25
Adelantado Carles PEE2.19
Aderiye Jadesola B PED2.26, PED2.27
Adimpong David B PEA1.40
Adolphe Ysabelle PEC1.40, PEC1.41
Aertsen A PEB2.66, PSB2.06
Aguilhon C PEC1.22
Akabanda F PEA1.36
Akabanda Fortune PEA1.37
Akbarien H PEB1.27
Akissoe NH PEA1.14
Alapont C PEC2.19
Alastrure A PEC2.19
Albert I PEC2.49
Alegria A. PEA1.46
Alessandria V PEA1.45, PEA1.65, PEC1.71, PSB1.05
Alessio G PEA1.34
Alexandre, H PSA2.01
Aiftren J PEE2.02
Ali Y PEA1.16
Allende A PED2.42, PSD1.04
Almeida E PEA1.39, PEA1.58, PEA1.76
Almeida MV PEC1.13
Alonso-Calleja C PEB2.51
Alsady M PED2.56
Al-Soud WA PEE2.14, PSE1.03
Álvarez JC PED1.05
Álvarez-Ordóñez Avelino PEB2.51, PEB2.52
Alves de Ávila AR PED2.61
Alvseike O. PEB2.52
Ambrožiè M PEC2.32
Amrouche, Tahar PSA2.06
An BK PEB2.10
Anastasio A PED2.06
Anastasiou R PEA1.11
Ancelet-Enjalric Sophie PEC2.49
Andersson G PEC1.07, PEC2.37
Andjelkovic M PEC1.102, PSB1.04
Andrade MJ PEA2.38
Andre Stéphane PEB2.12
Andreasen, AS PSE1.03
Andrews S PEB2.19
Andritsos Nikolaos PEC1.01, PEC1.72
Angelidis Apostolos PEA1.60, PED2.51
Anihouvi Victor Bienvenu PEA1.38
Anita F PEA2.22
Anslow P PEB2.44
Anyogu A PEA2.18, PEC2.28
Anyogu Amara PEB2.39
Aota T PEB1.02
Aponte M PEA1.43
Aponte Maria PEA1.75
Aquilanti Lucia PEA1.47
Arabshahi M PEB1.27
Aranda Medina E PEE2.06
Arapaki S PEB2.50
Arbault Patrice PEC1.80, PEB2.55
Arcangeli G PEC1.35
Arendt EK PEA2.27
Argyri Anthoula PEC1.55
Argyri, A PSD2.06
Arinder P PEC1.48
Arinder Pernilla PED2.29
Arneborg N PEA1.41, PED2.16, PED2.39
Arneborg Niis PEA1.10
Arosemena EL PEB1.25
Arosemena EL PEE2.19
Asakura M PEC1.77, PEA2.38
Atamer Zeynep PEA1.16
Atindehou MM PEB1.24
Aubert, X PSD2.04
Audenaert W TM PED1.25
Auvinen P PEA2.28
Avendano-Perez, Gaspar PSE2.04
Axelsson L PEB2.52
Ayaz ND PEB1.01
Aydin F PED2.60
Ayernor GS PEA1.38
Aymerich T PEA1.35, PEC1.32, PEC1.45, PED1.18, PED2.33
Aymerich Teresa PEB2.40
Azadnia Parisa PEA1.02
Azevedo A PEC2.22
Azimi-rad M PEB1.27
Azokpota Paulin PEA1.42
Baba-Moussa Lamine PEB1.24
Badirou EM PEB1.24
Baert L PEC2.48
Baert Leen PEC2.15, PSC2.04
Baffone W PEC1.101
Baffoni, Loredana PSE1.04
Baggesen DL PEC1.100, PED1.23, PSE1.02
Bahalul M PEA1.66, PEA1.67
Bak Christensen B PED2.14
Baila C PED1.19, PED1.20
Bang-Berthelsen I PED1.03
Baranyi, J PSC1.02, PSE2.04
Barbaro A PEB1.29
Barber A PEE2.02
Barbosa Matheus de Souza PED2.48
Barbuti S PEC1.76
Bardowski J. PEA1.46
Baril Eugenie PEB2.15
Barile M PED2.06
Barker G PEC2.06, PEC2.11, PEC2.37
Barmark G PEC1.12
Barrucci F PEC2.40
Barrucci Federica PEC2.39
Bartolomeoli I PEC1.34, PEB2.62, PEB2.63
Basaglia M PEA2.08
Bassami MR PEC2.45
Bassi D PEC2.53
Bassi Daniela PEA2.37
Batista Almeida e Silva J PEA1.26
Battilani A PEC2.54
Bavan T PEA1.19
Baylis C PED1.30
Beal Catherine PEA1.03
Beck Hansen T PED2.40
Begum M PEC1.56
Behera P PEB1.17
Belessi Charalambia-Irini PEB2.50, PEC2.46
Belfiore C PEB2.42
Belk KE PED1.27
Belletti N PEC1.32, PEC1.93, PED2.58
Bello OO PEA2.34
Beltran, D PSD1.04
Beney L PED2.34
Beney Laurent PED2.35
Benito Bernáldez MJ PEA1.13
Bensoussan M PEC1.73, PEC1.74, PEC1.75
Berkvens D PEC1.30
Bermúdez E PEA2.38
Bernard M PEC2.62
Bernardi T PED2.47
Berndtsson B PEB1.06
Bernini V PEA2.09, PEE2.09
Bernini Valentina PED2.18
Berstad A PEC2.08
Berthoud H PEA1.19
Berthoud, H PSA1.03,
Bessell, P PSC2.06
Bester Ingrid
Bešvir V F
Beuchat Larry R.
Beumer R F
F
Bianchi Daniela Man
Bianchi DM
Biavati, B
Bidot, D
Bigwood, T
Binter C
Birk T
Birk Tina
Bisotti S I
Bizzarri F
Bjerrum Lotte
Björkroth J
Björkroth KJ
Blaiotta G
Blaiotta Giuseppe I
Blana V I
Blank L
Bleicher A
Blessington T
Blohmke C
Bodrossy L
Body C
Boel Jeppe
Bogicevic, Biljana
Bolaños S
Bolton Declan
Bonetta S I
Bonetta Silvia I
Bonke R
Bonnichsen L
Borch E PEC1.48,
Bord C
Bordignon Stefano
Bordin P
Bordoni, A
Borilova G
Borkovcova I
Boseret G
Botsaris George
Bottari B
Bottari Benedetta
Botteldoorn N I
Bouix M
Boumgha-Bourtcha
Bourke P
Bouvier M
Bouw E
Bouwknegt M
Bover-Cid S I

PSD1.03 **Attachment behaviour of pathogenic bacteria on food and food contact surfaces in container transport**

*Stephen Abban (1), L Jespersen (1)*
*(1) Department of Food Science, Faculty of Life Sciences, University of Copenhagen, Denmark*

Transportation is one link in the food chain that is often overlooked with regards to cross contamination and safety, even in risk models. Coupled to this is the very low amount of information in this link of the food chain with regards to cross contamination. However, foreseeable scenarios show that this could be an important source of food contamination. Such scenarios include the smearing of container linings during food cargo loading and unloading, as well as dripping of condensates in containers with poorly regulated internal temperatures. The aim of this ongoing research is to understand the behaviour of pathogenic bacteria on different food contact construction materials as well as selected foods. In the present study 1cm² chips of 3 surfaces- aluminium, stainless steel and a re-enforced polymer are coated with suspensions of *Escherichia coli* K12 in the presence of chicken extracts or Luria-Bertani broth to mimic smearing. The surfaces have also been coated with buffered suspension of bacteria for 5, 10, 15 and 30 minutes to explore the time needed for maximal initial attachment. The surfaces have been characterized by $R_a$ and $R_z$ measurements. Apples were also coated with bacteria both in the presence and absence of chicken extract. Different cleaning set-ups mimicking processes typical for containers have been established to study the ease of detachment of the bacteria. Residual bacteria on the material surfaces are assessed by fluorescence microscopy using acridine orange stain followed by image analysis, and by plating and colony counting. Initial result trends show that the presence of food residue of animal origin has the effect of reducing the attachment ability of bacteria to the abiotic surfaces tested. The presence of chicken residue also caused about a log unit less attachment to the apple surfaces compared to bacteria in water. However bacteria that attach to and dry on surfaces with extracts were more difficult to detach compared to those attached without the extract. Adherence of bacteria cells and cleanability was related to the $R_a$ and $R_z$ of the surfaces. These initial trends show that the behaviour of bacteria on food and food contact surfaces during transport can be very complex and more research is needed in this link in the food chain to allow more accurate modelling.

PSD1.04 **Irrigation quantity and timing impact microbial risk of fresh-cut lettuce**

*A Allende (1), F López-Gálvez (1), M Moreno-Candel (1), D Beltran (1), A Martínez-Sánchez (1), JA Tudela (1), María I Gil (1)*
*(1) CEBAS-CSIC, Spain*

An unequivocal consequence associated to climate change is global warming. Among other climate effects, global warming can be also associated with extended dry periods. In fact, climate change is exacerbating water scarcity problems, which is an increasingly frequent phenomenon in the south of Europe, where most crop production of leafy greens takes place. Water scarcity is likely to reduce the water availability for irrigation in dry areas, which might have an impact on the microflora of vegetable products such as leafy greens. Additionally, the use of an excess irrigation quantity has been related to an increased in yield production. However, this might also have an impact on the quality and safety of leafy greens as it has been hypothesized that an increase of water availability increases the microbial population in plant due to a moisture accumulation on the leaves surfaces. In the present study we have evaluated the impact on the physiology and microbiological quality of deficit (-50% and -25%) and excess (+50% and +25%) of irrigation quantities during Iceberg and Romaine lettuce production as well as the irrigation termination at T1, T3 and T5, which refers to the days (1, 3 and 5) of the last irrigation before harvest. Additionally, the potential infiltration of *Salmonella enterica* serovar *Typhimurium* in the stress tissue during washing was also evaluated. The obtained results showed a reduction of about 25% and 50% of the irrigation quantities regularly applied to Romaine lettuce during cultivation reduced the microbial load, including total coliforms when compared to excess water irrigation. However, variation in the irrigation termination seemed not to have an effect on the natural microflora. These preliminary results show the intrinsic vulnerability of the fresh produce chain to potential emerging microbial hazards associated with climate change. Thus, the risk evaluation of newly identified threats associated with the anticipated climate change is very important to determine risk management strategies.